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SOME NOTES ON OCEANOGRAPHY.

HISTORICAL.—A number of articles have appeared during the past few months upon the history of ancient ocean voyages, which are interesting in this connection. The first which should be mentioned is the "Festschrift" of the Vienna Geographical Society, upon the occasion of the Vasco da Gama commemoration. The address of Dr. Paul Dinse is given in the *Zeitschrift* of the Berlin Geographical Society (Vol. 33, No. 1). There is also a note upon this subject by Prof. S. Ruge, in the *Verhandlungen* of the same Society (Vol. XXV, Nos. 5 and 6).

The voyage of Pinzon-Solis in 1508, when the second discovery of Yucatan was made, is discussed by P. J. J. Valentini of New York, in the Berlin Society's *Zeitschrift* (Vol. 33, No. IV).

There is also another article in the *National Geographic Magazine* (Vol. IX, No. 8), upon the subject of Gomez and the New York Gulf, which shows that this body of water was apparently unknown to the early Spanish cartographers, in spite of their assumptions to the contrary.

EXPEDITIONS.—Scarcely a year in the past decade has been noted for so many deep sea expeditions as the one just closed. In the *Geographical Journal* (Vol. XII, No. 5), the Prince of Monaco gives an account of his work for the past seven years, upon the oceanography of the North Atlantic.

Among the more noteworthy of the remaining expeditions are those of the *Valdivia*, the *Oceana*, the *Pola*, the *Siboga* and the *Helgoland*. The Austro-Hungarian expedition on the *Pola* has done an interesting piece of work upon the Red Sea. Notes upon this expedition are to be found in the *Geographical Journal* (Vol. XII, No. 6). And there is also a review of the report of Dr. Gräffe, on the microscopical organisms of the surface and bottom collections, in *Petermanns Mitteilungen, Litteraturbericht*, 619, on page 150.

A programme of the Dutch Deep Sea Expedition to the East Indian Archipelago in the *Siboga* is to be found in the *Geographical Journal* (Vol. XIII, No. 1), and a note upon the work in *Petermann* (1898, page 120).

Probably the most elaborate expedition of all those fitted out during the past year, was the German Deep Sea Expedition under Dr. Gerhard Schott. A preliminary report by Dr. Schott appears

in the Berlin Society's *Verhandlungen* (Vol. XXV, No. 10), in which he describes the course of the *Valdivia*, the apparatus for the oceanic work, the results obtained in the various scientific lines and also the meteorological work which was done upon the trip. There are notes upon this subject in *Petermann* (1898, pp. 120 and 264).

The North Sea Expedition of the *Helgoland* under Capt. Rüdiger was mainly a zoological expedition, but considerable bacteriological work was also done, besides hunting, sketching and the collection of materials for literary work. A considerable amount of oceanographical, meteorological and geographical material was obtained in the shape of observations. A digest of the work appears with a chart in the Berlin *Verhandlungen* (Vol. XXV, Nos. 8 and 9).

A note upon the work of the *Oceana*, upon the west coast of Ireland and on the border of the Continental Plateau, under the conduct of Mr. George Murray, of the British Museum, appears in *Petermann* (1898, p. 264), and a preliminary report is published in the *Geographical Journal* for February, 1899.

TIDES.—A considerable number of articles have appeared upon this subject recently, but the most important contribution which has appeared for years has been Dr. Darwin's book on the Tides, which has instantly sprung to the first rank, as a classic upon this subject. There is a notice of this work in *Science*, for Dec. 23, 1898.

Another article in *Science* (Dec. 9, 1898) discusses the limitations of the present solution of the tidal problem.

A series of articles upon the subject of tides by M. S. W. Jefferson has appeared in the *National Geographic Magazine* (Vol. IX, Nos. 9, 11 and 12). These articles discuss the subject of the tides of the open Atlantic Ocean, the estuarine and coastal tides of the Atlantic. They form a series of theses presented in the Research Course in Geography at Harvard University.

The tidal phenomena in the English Channel, and the South-western portion of the North Sea, have been discussed by Prof. C. Börgen in the *Annalen der Hydrographie* (1898, pp. 414 and 462).

In the Proceedings of the Canadian Institute, N. S. (Vol. I, pp. 28, 55 and 134), is an interesting series of communications from F. N. Denison, on the subjects of secondary undulation on tide gauges; the Great Lakes as a sensitive barometer, and the origin of ocean tidal secondary undulations.

The deep currents in the straits of Bab-el-Mandeb, and some observations upon the surface currents in the same locality, are described in the *Annalen der Hydrographie* (1898, p. 519).

In the same journal (1898, p. 10), there are observations upon the currents and color phenomena in the waters off the coast of Guiana. A note upon the Current Charts of the Pacific Ocean is found upon p. 226 of the same publication. On p. 405, the currents on the coast of Chile are described by Capt. Hoffmann. And the Chart of Oceanic Currents by G. Schott is reviewed by Dr. Neumayer on p. 409.

METEOROLOGY.—The work of Doberck on the law of storms (Hongkong, 1898), has been translated by Dr. Paul Bergholz of Bremen, and the section on Typhoons on the east Asiatic waters has appeared in *Gaea* (XXV, Nos. 1 and 2), and also in the *Meteorologische Zeitschrift* (1898, p. 332). There is also a note upon the same subject as brought to the attention of mariners by the pilot chart for the North Pacific (Aug., '79) in the *Zeitschrift* for Feb., 1898, p. 68.

An article containing some doubtful, or at least hazardous, conclusions upon the Winter winds of the North Atlantic Ocean, and the Anti-Monsoons of Africa is contained in the *Litteraturbericht* (p. 16) of the *Zeitschrift* for Jan., 1898.

Dr. W. Meinardus has discussed the relations of the winter climate of Middle and Northwestern Europe to the Gulf Stream in the Berlin Geographical Society's *Zeitschrift* (Vol. XXXIII, No. 3). In connection with this, three charts are given which are most satisfactory.

The yearly rainfall upon the oceans is discussed by Prof. A. Supan, in *Petermann* (1898, p. 179), and the article is accompanied by a chart.

Charts of the yearly isothermal and isabnormal lines upon the oceans are given by Prof. W. Köppen, in Table 9 of the *Annalen der Hydrographie*, 1898, and the explanatory text is to be found upon p. 356 of the same journal.

The elaborate article of Gerhard Schott upon the fogs of the Newfoundland Banks, in the *Annalen*, 1897, is reviewed by Dr. Meinardus in the *Meteorologische Zeitschrift* for January, 1898.

The *Annalen*, for 1898, publishes (p. 10) a list of all the important ocean earthquake waves which have been brought to the attention of the German Hydrographers, and (p. 312) a most instructive and carefully prepared article by Dr. O. Petersson upon the subject of the methods of hydrographic investigation.

W. L.